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Using the lens of “Social Shaping of Technology” to understand the design and implementation of Aadhaar (UID) Project

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Abstract. Extant Research on e-government projects has shown that multiple stakeholders are at play always, each with their own divergent interests. And many a time, differences in stakeholder expectations from a project has resulted in projects failing or being abandoned after initial usage. Social Construction of Technology (SCOT) studies look at the development history of a technology in order to understand how that particular technology has evolved, based on the interpretations of various stakeholders involved. This short paper looks at the Aadhaar project (Unique Identification Project) of India through a constructivist lens and tries to present the current understanding of the Aadhaar project, as seen by the various stakeholders, using publicly available data.

Key Words: Social Construction of Technology, Aadhaar, E-government, Stakeholders

1 Introduction – Building E-government systems.

Building a e-government system involves multiple stakeholders which can be classified as both demand side (the citizen users or even the businesses and government officials) and supply side (primarily the stakeholders responsible to conceiving, funding, implementing and maintain the systems) and it is important to have a framework that looks at both sides to determine the design or outcome of the system (De, 2005). The field of e-government research has seen a lot of growth over the past few years but research has largely been restricted to analyzing the impact of e-government and ICT4D projects and scholars have worked on philosophical and methodological issues related to that narrow aspect of e-government research (Heeks & Bailur, 2007). The studies so far mainly look at post implementation scenarios. So the researchers tend to emphasize on collecting data from the end users or the demand side. Hence a study which looks at the supply side and the decisions taken during the design, development and implementation of an e-government project would add key insights to the field of ICT4D related to how an e-government system evolves over time.

Currently Aadhaar (or the Unique ID project) project in India is in the news for its ambition of generating a unique Identity Number (ID) for each and every resident of the country. The main purpose, as claimed by the UIDAI, is to enable a number and an accompanying set of biometric details which will sufficiently prove the identity of a person. And the grander aim is to integrate this ID into systems and processes that facilitate the delivery of government services to Indian residents.

Since various stakeholders will have different intentions for promoting or impeding the implementation of such systems, the design of the e-government system will be influenced by the dominant stakeholders (e.g: some authorities would prefer that the e-government system aids centralized decision making in order to take some powers away from the regional authorities.) (De, 2005)

Such a situation reinforces the notion that e-government systems can be inherently political and this argument has also been emphasized by scholars who have argued that any technology can be inherently political and each technology has to be seen in its historical and social context, in order to understand its evolution better (Winner, 1985). And the role of politics can be more significant in cases where a particular technology enables a user to interact with the State for his regular needs.

It would be of interest to scholars, practitioners and policy makers if studies could include research on whether the user perception of these systems are influenced by some decisions taken during the design of the system itself. There are a lot of decisions to be made when a e-government system is to be implemented: identifying a

need; conceptualizing a solution; convincing stakeholders that there is a problem and there is solution for it too; putting together a team; getting the requirements ready; making a detailed design; then testing the project and then taking this to implementation; taking feedback and acting on them. Now all this requires multiple decisions to be made at various levels and it is important to understand how these decisions are made and how all this impacts this future use of the system. The user perception varies also depends a lot on how the system has been designed. The involvement of multiple stakeholders, each having their own perception of technology, results in ontological differences between stakeholders on the nature and purpose of a technology and thus a consensus need to emerge, over time, on what the meaning of technology is and how it evolves and eventually accepted by all stakeholders. (Bijker E. W., 2010) . SCOT studies (Social Construction of technology) attempt to address the above concern.

2 Social Construction of Technology

Social construction of Technology or Constructivist studies are based on the premise that any system evolves over time due intervention by various social actors and so the historical and social shaping of this system has to be considered to determine how a system is perceived by the users (Bijker & Pinch, 1984). The proponents of social shaping of technology argue that social and political relations, either directly or indirectly, shape the way technologies evolve (MacKenzie & Wajcman, 1985) and using this background, it would be interesting to study the design, implementation and evolution of e-government systems.

For e.g. The SCOT framework which is used to study the evolution of bicycles (Bijker & Pinch, 1984), first looks at the various social groups which try to define the problem (for e.g. deciding on how the bicycle is to be designed). After identifying the relevant social groups, an Empirical program of relativism (EPOR) was adopted by Bijker and Pinch(1984), to study how the ‘idea’ of the bicycle evolved over the years, due to multiple interpretations by the relevant social groups and they suggested the following stages of changes in technology:

Stage 1: This is the stage where the various relevant social groups interpret the technological artifact and the problems it tries to address, in ways they see appropriate to their social setting. This is the stage of interpretive flexibility.

Stage 2: Consensus stage: After multiple iterations on what a particular technology means, the groups try to arrive at a consensus on what the problem is.

Stage 3: The Closure stage – Once a common ground has been established on the ‘state’ of the problem, this is the stage where the technological solution to the problem is implemented in a larger social context.

So the SCOT framework necessarily takes into account on how multiple groups, each having its own perceptions of a problem or technology, arrive at a common understanding of the problem at hand.

Thus, the SCOT framework depends on the existence of multiple stakeholders and interplay of ideas between them. This calls for a more multidisciplinary approach to decide on the future path of science and technology as suggested in the paper on “Technologies of humility” (Jasanoff, 2003) , where the author refers to setting up of environments and processes where experts from multiple fields will interact to create science and technology that can go towards betterment of society. The papers also points out that progress should not be decided by Politics(policy) alone or by scientists alone but that they all should work together along with the public and produce work of good quality and adhere to ethics. The underlying notion is that is it not possible to predict the outcome of an event but if experts and users to interact, many antecedents and consequents of a change in technology can be debated upon.

In another paper which looks at how some commonly used artifacts have been designed, interpreted and used (Latour, 1992), the author suggests that no system can be artificially intelligent and hence there has to be a human actor to take calls. And thus, the strength and weaknesses of a system may be correlated to the strengths and weaknesses of the human actor. This paper draws some ideas from Structuration theory where agency influences structure and structure influences agency. The term ‘Agency’ is broad enough to include human and non-human actors. This again emphasizes that technology can only aid a human process but not solve every problem. Here is a statement from the paper that further emphasizes this view: *“It is not that society and social*

relations invade the certainty of science or the efficiency of machines. It is that society itself is to be rethought from top to bottom once we add to it the facts and artifacts that make up large sections of our social ties" (Latour, 1992). The author explains that the missing link is that we tend to look at things in black and white due to which we miss the shades of grey where a part of the non-human actors manifest in human actors and vice versa.

Another example of studying the evolution in the design and production of a technological artifact, through the SCOT framework, is the design of cars (Kline & Pinch, 1996) in the United States. Initially the car was resisted and seen in a very negative light in rural America but later various groups like manufacturers, the male and female users, new business entrepreneurs etc, each tailored the car for their own purposes. This serves as a very good example on how the technological artifact was interpreted in multiple ways and it exposed many new interpretations of an artifact and finally closure was reached upon agreeing to use different vehicles for different purposes, rather than using the same car for multiple purposes. (Kline & Pinch, 1996).

In another seminal paper, relevant to SCOT, the author looks at how politics plays a role in technological development (Winner, 1985). The author brings forward two aspects of politics in technology: One which is explicitly political (which seeks to exclude or include certain stakeholders directly during planning and implementation) and one which is implicitly political (e.g. - solar power can decentralize power generation whereas building nuclear power plants transfers more power to the government in electricity generation). The author sums up his paper saying *"To understand which technologies and which contexts are important to us, and why, is an enterprise that must involve both, the study of specific technical systems and their history as well as a thorough grasp of the concepts and controversies of political theory."* (Winner, 1985)

Based on the above SCOT studies, to apply the SCOT framework to study an e-government system, the following characteristics should be seen in the development of the system:

- Existence of multiple stakeholders, each having a different expectation from the system
- A situation where there is no consensus on what or how the system has to deliver
- Possible complications caused by the forces of 'politics'.

It would be relevant to apply this framework to any system which is a work-in-Progress, because from an academic point of view, one can see how the system is built and how the differences between stakeholders are resolved and this can contribute to the theory of design and development of e-government systems. And from a practitioner perspective, application of this framework offers a check point where in the practitioners and policy makers can review the progress and make changes to keep development on track. And since the Aadhaar project is at an earlier stage of implementation and pilot tests, this project is an ideal candidate to be subject to SCOT studies.

3 Possible example of looking at an Evolving ICT4D System: Aadhaar (UID) project

The Aadhaar(Unique ID) Project is being implemented in India, the purpose of which is to create a unique Identity for all Indian residents¹. The Unique Identification Authority of India (UIDAI) site clearly states that this card will be just be a proof of Identify but not a proof of citizenship or entitlement to any facility².

The unique ID project was launched by the UPA government as it hoped that creating a large registry would help it in implementing many schemes – MNREGS, PDS, Health schemes etc as evident from the documents on the UIDAI site. So the government created a Core Team, headed by Mr. Nandan Nilenkani, and through an executive order, and entrusted them with the responsibility of delivering this project.

¹ "Aadhaar is a 12 digit individual identification number issued by the Unique Identification Authority of India on behalf of the Government of India". <http://uidai.gov.in/what-is-aadhaar-number.html>

² <http://uidai.gov.in/what-is-aadhaar-number.html>

There are four clear groups who have different ideas about Aadhaar. The primary group is The Government of India (The United Progressive Alliance Government headed by the Congress party) which flagged off this project and is projecting this initiative as the basis of solutions to some of India's critical social issues. Then there is the UIDAI team itself, headed by Mr. Nandan Nilekani, which states that Aadhaar is just an ID proof which can lead to potential benefits, if leveraged properly by the public and private service providers. Finally, there are the residents at whom this project is targeted. Some of the questions that arise are - Do the residents know what they are signing up for? Have they been involved in any of the decision making process? Is there a feedback mechanism which helps in the review of the implementation process?

So the citizens believe that Aadhaar will make many facilities available to them. The Government thinks the Aadhaar would help in the implementation of its social schemes. The UIDAI itself states that this is only an ID proof and if this ID proof helps anyone to get some facilities then it would have served its purpose. Now these three contrasting situations would only lead to a big 'cycle of confusion' as each of these stakeholders have no clue where this project is heading. And this could lead to negative consequences as far as e-government projects are concerned. After the Aadhaar numbers have been generated, it is up to the various other systems like the banking systems, Public Distribution System, Oil and Marketing companies (LPG distribution) etc. to make use of the Aadhaar database. This adds a new dimension to the above questions as to how the ecosystem can be enabled. So the agencies looking to use the Aadhaar numbers will now become a relevant social group.

Table 1. Summary of relevant social groups

Relevant social group	View point of the group	Contradictory views	Resolution point
The Government at the Centre	Aadhaar is being projected as a solution to many of India's key challenges	India's problems is an amalgamation of socio-economic issues. Not just a technical one.	Aadhaar to be used as a tool. Not a 'solve-all'.
UIDAI Team	Aadhaar is just an ID. The emphasis is on technology.	The various pilot studies indicate other multiple forces at play other than just technology.	The UIDAI's duty is not clearly defined to the public
Public	Aadhaar can solve problems. Seen as a novel thing. A symbol of hope	Talk about Aadhaar not being a "proper ID card". Aadhaar seen as another card like ration card. Seen as an entitlement.	Clarifying the link between India's problems and the issue of a lack of identity.
The Aadhaar ecosystem stakeholders.	The PDS shop owners perceive this as a loss. Not willing to go into details. Perhaps due to stringent monitoring.	The users do not see it as a hassle but in some cases the issue of Identity make people lose benefits. These are people from the Economically weaker sections. Issues are deeper than identity.	How are some systems doing well without Aadhaar (like the PDS systems in some states).

As indicated in the above table, there seems to be multiple perceptions about the Aadhaar project and each social group seems to view the system from its own context. So it will be interesting to observe how the various differences of opinions are sorted out and make this a successful initiative.

4 Conclusion – Does SCOT offer answers?

Using Social Construction of Technology to study an ongoing project (like the Aadhaar project) can help the various stakeholders to reach a consensus on what the current problems are and help them work towards an effective solution. And these problems can be addressed at the design stage itself.

Now the any design decision taken should be analyzed using questions on the following lines: Will this decision favour a particular stakeholder? Is this design inclusive or is it exclusive for certain type of users? Is this design sustainable or does it have a short term political motive? Can we draw inspiration from history or from other examples around the world, as to what the probable impacts of these design decisions are?

So a SCOT study on finding the set of stakeholders, who use interpretive flexibility to look at an artifact and the final terms of closure they agree upon, is a good framework to apply to the UID project. Given that there are multiple stakeholders in such studies, the SCOT framework can reveal interesting explanations and solutions for the challenges identified.

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